REMARKS

The Official Action dated October 12, 2004, has been received in its contents carefully noted. In view thereof, claim 1 has been amended in order to better define that which the Applicant regards as invention. Accordingly, claims 1-9 are presently pending in the instant application.

With reference to paragraph 2 of the Office Action, claims 1-9 have been rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,401,994 issued to Adan. This rejection is respectfully traversed that the patent to Adan neither discloses or suggest that which is presently set forth by Applicants' claimed invention.

As can be seen from the foregoing amendments, independent claim 1 has been amended to recite a semiconductor device comprising several elements including first-conductivity-type pocket regions doped with indium ions, and formed between the channel region and respective lower regions of the source/drain regions, such that the first-conductivity-type pocket regions are in contact with the source/drain regions and in no contact with the gate insulating film.

More specifically, independent claim 1 is directed to a semiconductor device as supported by Applicants' specification and represented by Figure 1 and recites a semiconductor device comprising a gate electrode formed on a semiconductor substrate with a gate insulating film interposed therebetween, a channel region composed of a first-conductivity-type impurity layer formed in a region of a surface portion of the semiconductor substrate located below the gate electrode, source/drain regions composed of second conductivity-type impurity layers formed in regions of the surface portion of the semiconductor substrate located on both sides of the gate electrode, second-conductivity-type extension regions formed between the channel region and respective upper portions of the source/drain regions in contact relation with the source/drain regions, and as noted hereinabove, first-conductivity-type pocket regions doped with indium ions, and formed between the channel region and respective lower regions of the source/drain regions, such that the first-conductivity-type pocket regions are in contact with the source/drain regions and in no contact with the gate insulating film. Clearly, this is not the case with the teachings of Adan.

In reviewing the Adan reference, in particular with reference to Figure 2E, it is noted that this reference disclose a semiconductor device including a gate electrode 7 formed on a Si substrate 1 with a gate dielectric film 6 interposed therebetween. The device further includes a channel region P1 composed of a first-conductivity-type impurity layer formed in a surface portion of the Si substrate and in a region directly below the gate electrode 7. Additionally, source 13 and drain 14 regions composed of a second-conductivity-type impurity layer respectively are formed in the surface portion of the Si substrate and in regions on both sides of the gate electrodes 7. The second-conductivity-type extension regions 19, 20 respectively formed between the respective upper regions of the channel region P1 and the source region 13 and drain regions 14 are provided such that the respective extension regions 19 and 20 are either in direct contact with the source region 13 or the drain region 14. The device further includes first-conductivity-type pocket regions P2, P3 respectively, formed between the respective lower region of the channel region P1, the source region 13 and the drain region 14 such that the respective pocket regions P2, P3 are either in contact with the source region 13 or the drain region 14. In accordance with this structure, the pocket regions P2, P3 are formed such that the pocket regions cover the side and bottom surfaces of the extensions regions 19, 20 from below and are in contact with the gate dielectric film 6 below the gate electrode 7. Clearly, this is directly contrary to that set forth by Applicants' claimed invention wherein amended claim 1 recites that the pocket regions are formed below the bottom surfaces of the extension regions and are not in contact with the gate insulating film. Accordingly, it is respectfully submitted that independent claim 1 as well as those claims which depend therefrom clearly distinguish over the teachings of Adan and are in proper condition for allowance.

With respect to independent claim 7, it is likewise respectfully submitted that this claim clearly distinguishes over the teachings of Adan.

Similar to independent claim 1, claim 7 recites a semiconductor comprising a gate electrode, a channel region, source/drain regions, second-conductivity-type extension regions, first-conductivity-type pocket regions formed between the channel region and the respective lower portions of the source/drain regions and in contact with the source/drain regions and spaced apart from the gate insulating film as well first-conductivity-type lightly doped channel regions formed in both side portions of the channel region in contact with the

extension regions, each of the lightly doped channel regions containing an activated impurity at a concentration lower than in a center region of the channel region. Again, it is respectfully submitted that Adan fails to disclose or suggest these features.

Specifically, independent claim 7, which is supported by Figure 3 of Applicants' specification, recites a semiconductor device wherein "the first-conductivity-type lightly doped channel regions formed in both side portions of the channel region in contact with the extension regions with each of the lightly doped channel regions containing an activated impurity at a concentration lower than that in a center portion of the channel region." With respect to the teachings of Adan, and particularly column 4, lines 8-13, it is noted that this reference specifically recites "by the first and second channel dopings of the central portion (P_1 of Figure 1(E)) is lightly doped so as to enhance the mobility, while the extreme portions (P_2 and P_3 of Figure 1(E)) of the channel are heavily doped." Hence, claim 7 of the present invention is clearly different from that of Adan, since according to claim 7, the extreme portions have a lower concentration of impurity than the center portion while with a device set forth by Adan, the extreme portions have a high concentration of impurity as compared to the center portion.

It is further noted that while the Examiner refers in page 5 of the Office Action that Adan discloses "center portion $5X10^{12}/cm^2$ and side portions $1X10^{12}/cm^2$" these are the dosages of the first and second channel dopings and not the total dosages for the center and side portions. According to Adan and as shown in Figure 2(B), the center portion (P1) of the channel region is only doped with first channel doping ($5X10^{12}/cm^2$), while the extreme portions (P2, P3) of the channel region are doped with the first ($5X10^{12}/cm^2$) and second ($1X10^{12}/cm^2$) channel dopings. Consequently, the extreme portions must have a higher concentration of impurity as compared to the center portion. Consequently, it is respectfully submitted that Applicants' claimed invention has set forth in independent claim 7 as well as dependent claim 8 clearly distinguish of the teachings of Adan and are in proper condition for allowance.

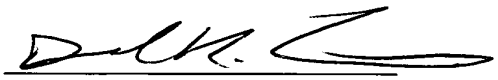
As to independent claim 9, this claim recites a semiconductor device wherein the first-conductivity-type lightly doped channel regions are formed in both side portions of the channel region in contact with extension regions and that each of the lightly doped channel regions contain and activated impurity at a concentration lower than in a center portion of the

channel region. On the other hand, as noted in column 4, lines 8-13 of Adan, "by the first and second channel dopings the central portion P_1 of Figure 1(E) is lightly doped so as to enhance the mobility, while the extreme portions P_2 and P_3 of Figure 1(E) of the channel are heavily doped". Consequently, claim 9 of the present invention clearly distinguishes over that of Adan since as recited in claim 9 the extreme portions have a lower concentration of impurity than the center portion while according to the device of Adan, the extreme portions have a high concentration of impurity as compared to the center portion. Accordingly, it is respectfully submitted that Applicants' claimed invention is set forth in independent claim 9 clearly distinguishes over the teachings of Adan.

Therefore, in view of foregoing, it is respectfully requested that the rejection of record be reconsidered and withdrawn by the Examiner, that claims 1-9 be allowed and that the application be passed to issue.

Should the Examiner believe a conference would be of benefit in expediting the prosecution of the instant application, he is hereby invited to telephone counsel to arrange such a conference.

Respectfully submitted,



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